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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,169	08/30/2004	Gregory G. Zaharchuk	GEMS8081.225	5168
27061	7590	12/12/2005	EXAMINER	
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (GEMS)			SHRIVASTAV, BRIJ B	
14135 NORTH CEDARBURG ROAD			ART UNIT	
MEQUON, WI 53097			PAPER NUMBER	
			2859	

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/711,169

Applicant(s)

ZAHARCHUK ET AL.

Examiner

Brij B. Shrivastav

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8.31.04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-5, 9-11, 13, 16-20, 24 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolff et al (US 6,618,605).

As regards to claim 1, Wolff et al teach a pulse sequence to suppress background tissue, the pulse sequence including a slice selective pulse to spatially select an ROI for spin suppression, followed by a number of non-selective RF pulses to suppress magnetization of the static spins within the ROI, which is further followed by an imaging pulse to excite the inflowing spins to the ROI after the non-selective pulses (figure 2 and 3; column 5 and 6, lines 59-67 and 1-62).

As regards to claim 10, Wolff et al teach a method of MR imaging, including steps of selecting an ROI in which the flow therein will be imaged, first by applying a train of low energy RF pulses to suppress magnetization of spins in the ROI, followed by exciting longitudinal magnetization of inflowing spins in the ROI, and acquiring MR data from the inflowing spins (figures 1-3, and 5, column 5 and 6, lines 59-67 and 1-62, column 7, lines 9-65, column 8, lines 32-64).

As regards to claim 16, Wolff et al teach an MR apparatus to acquire angiographic or perfusion image data with background suppression, the apparatus

includes a magnetic resonance imaging system, having a plurality of gradient coils, a magnet to impress polarizing magnetic field, an RF transreceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images (figure 1, numerals 32, 42, 54 and 62, column 9, lines 10-56); a computer programmed to apply a pulse sequence to apply a slice selective pulse to induce transverse magnetization in spins of a predetermined volume (figures 1-3, numerals 20 and 32, column 9, lines 30-40); a series of non-selective pulses to suppress the transverse magnetization of the spins of the pre-defined static volume; and an excitation pulse to include transverse magnetization in inflowing spins to the predetermined static volume (figure 2 and 3; column 5 and 6, lines 59-67 and 1-62).

As regards to claim 24, Wolff et al teach a computer readable storage medium having a computer program stored thereon and representing a set of instructions that when executed by a computer causes the computer to apply a slice selective RF pulse and gradient to spatially define a volume for background suppression (figure 1, numerals 20, 32, 42); further applying a train of non-selective pulses to lock spins in the volume, and applying another slice selective RF pulse to excite longitudinal magnetization of flowing spins in the volume (figures 2-3, 5, column 5-7, lines 56-67, 1-67 and 9-65).

As regards to claims 2-5, 9, 11, 13, 17-20, and 25, Wolff et al further teach slice select pulse of 90 degree flip angle, low energy slice selective RF pulses to suppress magnetization and spin locking of static spins in combination with crusher gradient pulses with EPI readout (figures 2-5).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 6-8, 14, 15, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al (6,618,605) as applied to claims 1, 10, 16 and 24 above, and further in view of Foltz et al (US 6,094,591).

As regards to claims 6-8, 14, 15, 22 and 23, Wolff et al do not specifically teach use of pulse pairs in non-selective RF pulses having flip angles of +360 and -360 degrees based on specific situation and the application of these pulse transverse to slice selective pulse. Foltz et al teach use of pulse pairs in non-selective RF pulses having flip angles of +360 and -360 degrees based on specific situation and the application of these pulse transverse to slice selective pulse (figure 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement teachings of Foltz et al with the teaching of Wolff et al to optimize MR data acquisition conditions to increase S/N ratio and decrease data acquisition time for imaging.

3. Claims 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolff et al (6,618,605) as applied to claims 10 and 16 above, and further in view of Hardy et al (US 5,192,909).

4. Correction is required for the dependency of claim 4.

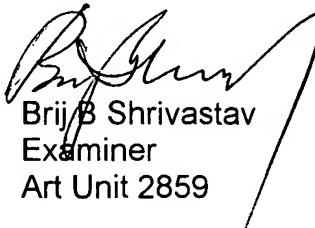
5. As regards to claims 12 and 21, Wolff et al teach EPI readout, however, do not teach spiral readout for imaging pulses. Hardy et al teach spiral readout for imaging pulses (figure 3-4). It would have been obvious to one of ordinary skill in the art to implement Hardy et al's teaching use of spiral covering more than one dimension of the imaging object improving MR data quality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B. Shrivastav whose telephone number is 571-272-2250. The examiner can normally be reached on 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. F. Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

November 28, 2005

  
Brij B Shrivastav  
Examiner  
Art Unit 2859

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